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The Landscape of the Czech-Austrian Borderland: Development and Heritage

Summary

Roztoky u Křivoklátu

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Landscape is a key geographical concept and geographical research on land change and land use has a tradition that can be dated back for almost a hundred years. The development of the subject orientation of land change science can be divided into two phases. (i) During the first phase (50's/60's of the 20th century) the description of landscape and its morphology (structure) were at the centre of research interest along with the research of the potential for agro-production. This particular type of study was motivated by the need to find a solution to the problem of the increasing inability to supply a growing (European) population with agricultural products. (ii) In the second phase (circa from 70's of the 20th century), the attention of scientists towards the accelerated rate of land change on a global scale that can be associated with: the increase of human population, changes in agricultural techniques, mining, environmental exploitation et cetera. There is an obvious need to solve the negative impacts of the human activities on the landscape at different scales (from local to global). Landscape changes have been put on the list of the four most serious environmental problems for its wide range of consequences (Walker and Steffen 1997, Walker 1998). Currently scientists, who are interested in land change, are looking for connections between land change and other phenomena. They are attempting to explain land change effects and their consequences. The seriousness of the whole issue can be supported by the existence of several international projects that have been exploring it in last two decades (e.g. CORINE – Coordination of Information on the Environment, LACOST – Land Cover Changes in Coastal Zones, IGU/LUCC – Land Use and Land Cover Change work group within the International Geographical Union etc).

It is necessary for land change science to cooperate with a wide spectrum of scientists in order to search for ties between observed land change and social, economic and political developments and technological progress. Crucial is also the explanation of the "driving forces" which research requires a broad approach. Currently, researchers from different scientific backgrounds have engaged in the debate about landscape. Consequently there is a broad variety of approaches to landscape research. This conclusion can be supported by an increasing range of information that can be used in land change research. A review of literature shows that two main approaches to landscape research can be distinguished (i) The first studies land change using a quantitative approach or "hard" data (e.g. using agricultural census data, remote sensing data, etc.) and can be labeled as (post)positivistic; the second one elaborates on subjective "soft" data about the landscape (e.g. perception of the landscape by its residents, reflection of land changes in behavior/acting of the communities, etc.) and its nature is humanistic. Scientists, who are investigating landscape

with one or the other approach, can be found worldwide. And Czech geography is no exception to that where several science centers based on (post)positivistic approaches to land change research have developed over the last two decades. Such approaches include: (i) Historical-geographical approach with socio-economic and later cultural-geographical emphases; (ii) Landscape ecology and geo-ecology with close ties to physical geography; (iii) Approach a priori based on remote sensing date and its evaluation in a GIS environment.

The research presented here uses the historical-geographical approach in land change science and for that its aim, data sources and methodology is taken from that approach. The object of our research is to explain the broader consequences of long-term landscape development and to view land change in relation to social, cultural, economic and political change.

The research fits within the general frame of topics that are cutting edge and that are currently being solved by national and international scientific teams. Current land change science approaches and topics are analyzed in one thesis chapter. Knowledge about already accomplished research studies together with overview of the future possibilities for land change research is crucial to shape our research questions and goals in order to do research which would be cutting edge, would not be duplicating already finished studies, would be contribution and enrichment of older studies, would be an inspiration and first step for future research work. The current research was undertaken due to the following reasons:

(1) A broad comparative study, that confronts, evaluates, and explains land change in Czechia and neighboring countries has not yet been undertaken.

(2) Czech borderland is a space where a lot of analysis took place in recent years (e.g. Štěpánek 1992; Kušová and Bartoš 2000) and it was also a topic for general elaborations (e.g. Hampl 2000, Jeřábek, Dokoupil, Havlíček et al. 2004). However, human geographical researches focusing on country borders are rare – with the exception of the study of Lipský 2006a or Kubeš 2007. Moreover, neighboring borderlands are a perspective space with many research topics for land change science (Bürgi, Hersperger and Schneeberger 2004), but Czech studies are investigating only the Czech borderland with very exceptional and minimal overlap across the frontier.

(3) Changes in the Czech landscape in the period of the communist government are believed to be strongly influenced by specific factors related to ineffective and twisted communist agricultural policy, which was aimed at high rate of production and self sufficiency. At the same time there is no prior research that compares and analyzes land use development in

Czechoslovakia and land use development in a country based on democratic and free market principles. We know very little about differences in landscape development and landscape effects of socialistic and "free-market" agricultural concepts.

(4) The borderland, where Czech Germans were a majority, still shows social-geographical differences to the interior of the country (Chromý 2000; Kuldová 2005). Also landscape development in the borderland is different when compared to the rest of the country (Bičík and Štěpánek 1994; Bičík and Kabrda 2008) and it has been highly influenced by historical affairs and partly by military-strategic importance of the borderland (boundary between Western and Eastern Europe). However, a study that compares the landscape development on the both sides of so called "Iron Curtain" is still missing. Thus, our understanding and knowledge of whether landscape development was different on the eastern side of the curtain is very limited. We do not know if there are just differences or any similarities in landscape development on both sides of the Iron Curtain.

There are many unanswered questions in the field of historical-geographical research of landscapes At the same time there is much potential for studies focusing on cross-boundary issues. The Czech-Austrian borderland was chosen as the subject of this study as it involves several different types of landscape. Furthermore, comparable land use data can be obtained for both the Czech and Austrian sides of the boundary. The time frame for our research is the period of totalitarian power in Czechoslovakia, i.e. 1948–1990. The beginning of this period was a time before the landscape could have been influenced by communist agricultural transformation. Towards the end of the period, the landscape shows clear indications that social and centrally planned management had been implemented. Data from the same or close years have been collected also for Austrian part of the borderland (1949-1990). There has been no previous research that investigates from a historical-geographical perspective such a large and mainly cross-boundary study area in Central Europe. The selected time frame permits the identification of common/different features of landscape development under two different political regimes – i.e. capitalist and socialist. The first research objective is as follows:

(1) *To make a contribution to our understanding of a boundary and border space with a study that would investigate landscape development and land changes in a cross-boundary region. Additionally, to explore and to explain land changes in relation to specific and general trends in landscape development in Czechia and Austria during the time of bipolarized Europe.*

It is mentioned above that landscape can be investigated through humanistic approaches. This research delves on two such approaches: the memory of the landscape; and landscape heritage. Both of these concepts focus on description of the landscape and its elements. They look for a symbology of the landscape, develop understanding of the landscape, and emphasize the directly-lived connection between humans/society and landscape. The development of humanistic approaches to landscape science can be viewed as an alternative to (post)positivistic approaches. Scientists investigating landscape with a humanistic approach attempt to explore the picture of the landscape and to anchor the landscape in the context of national, community or individual development. Studies that explore landscape memory and landscape heritage are mostly highly descriptive and idiographic. Such studies focus on perception of the landscape rather than on landscape changes or development. Humanistic based researches are derived from subjective "soft" landscape data, which originates in observations, interviews and enquiries. On the other hand, the core of the landscape memory and landscape heritage can be seen in landscape stability or the stability of elements in the landscape. This conclusion is not explicitly formulated when reading about presented concepts but at the same time it ensues from their quintessence. This conclusion provides us a new direction of scientific research that could focus on the objectification of such stable landscape elements, which consequently can be seen as landscape memory or landscape heritage. It also enables us to evaluate different landscapes on the same basis. Consequently, we can make conclusions about the historical and memory potential of selected landscapes. No prior research investigates stable landscape elements in different landscapes or attempts to compare landscapes on the basis of common stable landscape elements. Only landscape archeology can provide some clue and methodology on how to approach the subject of stable landscape elements, old settlement sites and old merchants' routes. The second research objective is as follows:

(2) *To contribute to discussions about landscape memory and landscape heritage by proposing a methodology that would identify and investigate stable landscape elements. Such a methodology would enable the researchers to compare/contrast Czech and Austrian pre-industrial and (post)industrial landscape using new land science techniques. Additionally, it would enable the analysis of "driving forces" on the landscape from the new perspective of 'the development of stable landscapes'.*

The Czech-Austrian borderland was the area where both phases of the research were undertaken. Having a common study area enables the comparison of Czech and Austrian landscape through the lens of two different approaches. The identification of the stable

landscape elements requires a detailed analysis of the landscape and for that reason it was not possible to study the whole territory of the Czech-Austrian borderland. Therefore, two smaller case areas were selected. These are called “Vitorazsko” and “Valticko” in the study. Since we are interested in the stability of landscape elements over a period time, a longer time period than in the previous part of the research was selected. Based on the knowledge of the availability of landcover data, two (three) years were selected for our analysis 1821 (Valticko), 1823 (Vitorazsko) and 2005 (Vitorazsko and Valticko).

We sketched two main research objections of the study together with the motivations for the research itself. The chapters in the thesis are ordered according to objectives. The theoretical-methodological chapter provides an introduction to land change science and its history. The two humanistic approaches – landscape memory and landscape heritage – and their ties to stable landscape elements are also discussed in the methodology chapter.

Given that landscape development is closely related to agricultural development, a chapter on processes influencing Czech and Austrian agriculture is also included. We tried to identify common and different features of Czech and Austrian agriculture and its history. Changes in agricultural policies and their impacts on the landscape development are discussed as well. The chapter provides basic insight into agriculture with respect to landscape development in both countries.

The empirical research is presented next. The methodology, analysis and evaluation sections of the empirical research are presented (i) first for the Czech-Austrian border and (ii) next for the case study locations of Vitorazsko and Valticko.

Analysis in support of the first research goal of ‘analysis and comparison of the land change in the borderland in the time of bipolar divided Europe’ was based on the evaluation of land use structure (the following land use categories were distinguished: arable land, grass land, permanent cultures, forests, built-up areas, water areas and other areas) in years of 1948 (Czechia), 1949 (Austria) and 1990 (Czechia and Austria). Research findings show that the borderland territory can be divided into three sections – western, central and eastern. The key to such categorization was the land use structure in the sections which differ from each other based on natural preconditions. The western (highland to mountainous) section of the Czech and Austrian parts of the borderland is under extensive agriculture. In contrast, the eastern (lowlands) section is under intensive agriculture. This spatial differentiation has been reinforced due to agricultural extensification and inhibition in the western section (on both the Czech and Austrian sides). Therefore, natural preconditions determine land use in the

western section, “differential gavel” (Jeleček 2002a). Moreover, the natural preconditions are superior to the influences of specific factors (different agricultural policies, different regional development and different country priorities for the border areas). In our first research assumption we predicted that there would be witnessed a decline in arable land share in areas that are less favorable for crop production. The conclusion above confirmed the first part of our first research assumption. Simultaneously, based on the gained knowledge of the agricultural history in Austria and Czechia, we had predicted that the decline in arable land share would not be rapid even in less naturally favorable areas. The analysis showed that decline in the share of arable land was about 10% in both Czech and Austrian extensively used western section. Since the 10% decline does not represent a rapid decline, we can claim that the second part of our first scientific hypothesis was confirmed. Whilst the general land use trend (meaning the differentiation of agricultural usage of the borderland) was the same on the Czech as well as on the Austrian side of the boundary, the differences can be identified in the process of extensification – under the influence of specific factors (i.e. different demographical development, different governmental development intentions, different preferences in agricultural management). Whereas an increase in share of forests and decline in the share of grassland were observed on the Czech side of the western section, there were a significant increase in the share of grassland and an increase in the share of forests on the Austrian side of the western section. If we wanted to understand and to disclose all possible influences of the difference in the extensification processes, it would be necessary to undergo an analysis according to DPSRI scheme (Feranec, Šúri, Oťaheľ et al. 2001, Kabrda 2008), which is beyond our research objectives. On the other hand, we tried to search for one of the possible relation in the demographical development. Studies undertaken in other countries document that extensification of agricultural production can be tied not only to natural preconditions but also to a process of depopulation (Sayadi, González-Roa and Calatrava-Requena 2009; Suarez-Seone, Osborne and Baudry 2002). Population development in the Czech western section was highly influenced by the post-war transfer of Czech Germans. In other words, the long-term land owners had to leave their property. Despite the fact that new settlers came to the borderland, some of plots did not regain (new) owners (Slezák 1978). It did not take long and the new owners lost their property in nationalization after 1948. It meant that locals lost the ability to control the land use in their landscape. In contrast the population on the Austrian side of the western section had kept on continual growth. It can be assumed that the land never lost its owners and despite the fact of the changed land use of plots (arable land →

grassland), the owners never stopped maintaining their land and property. Therefore, the extensification of the agricultural production in the Austrian western section was accompanied by the increase of grassland.

The second research goal was to investigate if there is a relationship between the distance from the boundary and land use structure and development. To establish this fact, we divided the borderland into three 10km wide parallel zones (three on each side of the boundary). We assumed that the land use in the Czech boundary neighboring zone will be (significantly) different to the other two zones. Evaluation of the land use structure showed that the boundary neighboring zone does not differ from other "interior" zones. This finding is true for the Czech as well as Austrian part of the borderland. A slight dependency between the distance from the boundary and the land use structure was disclosed in the western section of the borderland but we came to a conclusion that the influence of the natural preconditions might play more important role than the distance factor. We also investigated whether the zone neighboring the boundary had a higher propensity for land change. Our analysis disproved our assumption. In the last step we compared the land use structure in the boundary neighboring zone and other zones but this analysis did not show any exceptional land use structure in the boundary neighboring zone. In the end we had to declare that our scientific hypothesis was disproved.

The third and last research goal in this study section was to evaluate land use development in relation to natural preconditions. We have already discussed that the borderland can be differentiated as the western part under extensive agriculture and the eastern part under intensive agriculture. The central section has not shown any changes in land use structure. Whilst the extensification process was common for the Czech as well as for the Austrian western part of the borderland, in the eastern (lowlands and fertile) part of the borderland we identified different land use development trends on the both sides of the boundary. It could be claimed that there was an intensification process on the Austrian part of the borderland (increase in the share of the arable land). In contrast on the Czech side of the eastern section of the border land the process of specialization was a key process (increase in the share of vineyards and orchards). From the results we can conclude: LFA (less favorable areas) tend to be extensified. At the same time, the form of the extensification process (a forestation contra increase of grassland) depends on specific factors (economic, politic, demographical, etc.). We also found out that favorable natural conditions do not ultimately mean intensification of the agricultural production. The form of agricultural

development of such areas is under the influence of specific factors as we have proved in the eastern section of the borderland (intensification contra specialization).

The central section of the borderland has two interesting land use features: (i) stability in land use categories during the study period; (ii) mutual similarity in land use structure on the Czech and Austrian sides of the borderland. Therefore, it can be concluded that political and social developments in Austria and Czechoslovakia have not influenced land use structure. At the same time, it is not possible to claim that a certain section of the borderland could have been differentiated under the influence of specific factors (different political systems, different agricultural policy etc.). Consequently, there is no evidence of changes related to communist agricultural restructuralisation (i.e. collectivization, mass agricultural production, twisted redistribution of farms profits, etc.).

Accomplishment of the primary research goals and found answers to our research hypothesis have closed the first stage of our analysis, which was aimed at the land use development in the Czech-Austrian borderland in the time of bipolar Europe. Our results were gained by the evaluation of the statistical data. The second level of our research took place in the two case areas – Vitorazsko and Valticko. They differ from each other in natural preconditions. The land cover evaluation of these areas was focused on the state of the landscape in years 1821 (Valticko), 1823 (Vitorazsko) and 2005 (Valticko and Vitorazsko). Digitized and vectorized old maps and aerial photos were the primary sources of data for our analysis.

The first goal of the second research section was to analyze the land cover changes between 1821/23 and 2005 with a focus on the identification of differences both in national and cross-boundary comparison. We assumed that, given natural preconditions, the change of the landscape from preindustrial into (post)industrial would have been accompanied by an extensification process in Vitorazsko area, whilst in the (fertile) Valticko area we would witness the intensification process. The landscape of the Vitorazsko area has turned into less agriculturally exploited region with a low share of arable land on the both sides of the boundary. Therefore, our assumption was correct for the Vitorazsko area. By analog, it could be assumed that favorable natural preconditions would mean a process of intensification of agricultural production. However, the results obtained from the land use structure in the Valticko area do not support our assumption. We recorded the process of specialization in the vine growing (both on the Czech and Austrian side of the Valticko area). Nevertheless, the share of plots used for crop production (arable land) was without a change on the Czech

side and even declined on the Austrian side of the case area. Based on our findings it can be concluded that the extensification of the agricultural/crop production is closely tied to less favorable natural preconditions (LFA). Favorable natural preconditions do not ultimately lead to intensification of the agricultural production. They can also be a trigger for specialization in the production of fruits or vine. We also find that the process of extensification (both on the Czech and Austrian side of the Vitorazsko area) as well as the process of specialization (both on the Czech and Austrian side of the Valticko area) are accompanied by the same rates of the change in the landscape.

The next step of our research was related to stable plots and the stable boundaries of plots within the case areas. First, we investigated the structure of stable plots on the Czech and Austrian sides of the case areas and then we compared our results on the national level (meaning Czech side of Vitorazsko vs. Czech side of Valticko) and also across the boundary. In other words, we analyzed the stable plot structures in relation to the level of development of each country and in relation to different natural preconditions. The assumption was that the cross boundary comparison would distinguish the Austrian sides of the case areas as the sides with the higher share of stable plots due to drastic agricultural change witnessed in Czechoslovakia in the second half of the 20th century. On the other hand when comparing the national sides of the case areas we assumed that the structure of stable plots would vary; that there would be a high share of stable forest and grassland plots in the Vitorazsko case area and that there would be a higher share of stable arable land plots in the Valticko case area. The evaluation showed that the overall share of stable plots is the same in the landscape where agricultural production has declined as well as in the landscape where agricultural production has become specialized. Surprisingly, there are very little differences in the overall share of stable plots when comparing the Czech and Austrian sides of the case areas. Thereofore, our research hypothesis was not confirmed. Two conclusions can be made based on our findings. (i) The overall share of stable plots is independent of the prevailing agricultural usage of the landscape. (ii) The overall share of stable plots is neither dependant on influences of general (natural preconditions) nor specific (agricultural changes related to political, social and economic development) factors. Although our case areas are representative of the Czech-Austrian borderland, it would be essential to undertake further analysis on more case areas to confirm the validity of our conclusions.

There was a high share of forests and grass lands in the structure of the stable plots of the (Czech and Austrian side of) case area Vitorazsko. In the case area Valticko we identified a high share of arable land in the structure of stable plots (on the Czech as well as Austrian

side of the case area). There was also a significant share of forests in the structure of the stable plots on the Czech side of the case area Valticko. On the Austrian side of the Valticko case area there was a significant share of vineyards in the structure of the stable plots. Therefore, our research hypothesis was confirmed.

The last part of our research was dedicated to identification and evaluation of stable plot boundaries. We assumed that there would be a higher share of stable plot boundaries in the Valticko case area compared to the national level. When comparing the Czech and Austrian parts of the case areas, we assumed that there would be a higher share of the stable plot boundaries in the Austrian parts of the case areas.

The results confirmed our assumptions. In both the Czech and Austrian parts of the Valticko case area, there was a higher share of stable plot boundaries compared to the national level. In both case areas, the Austrian parts had a higher share of stable plot boundaries than in the Czech ones. Therefore, our primary hypothesis was confirmed.

In conclusion it can be stated that the presented research has enriched our understanding of landscape development in the borderland. The study also provided a trans-boundary comparison and by that variegated land change research. Some of the specific as well as general processes in landscape development were viewed in an international context (not only by the trans-boundary research, but also by presenting international examples of the landscape processes that have similarities in the development of Czech landscape). Our research has disclosed that the extent of land use change on the Czech and Austrian sides of the borderland is similar. The Czech borderland does not show any exception or anomaly in land use development. Land use change in the boundary neighboring zone are not higher or different to land use changes in the “interior” zones. Therefore, it cannot be stated that land use development under the influence of the boundary was any different or exceptional.

Another contribution of the research is in study of the landscape structure and its changes. The case areas presented with such acreage had not been previously studied in such detail. On the other hand, the elaboration of old maps and aerial photos were greatly time consuming, so that additions of another analyzed years were beyond our work and time possibilities. Our results provide a good description of preindustrial and (post)industrial landscapes. We disclose that the share of stable plots is similar in the Czech and Austrian landscape. From this point of view, the Czech landscape does not differ from the Austrian landscape. Changes in plot boundaries (consequently in the landscape structure) seem to be crucial for the different “look” of Czech and Austrian landscape.

The research also presented a methodology to objectify and evaluate stable landscape elements (plots, plot boundaries). The methodology can be adopted for future studies in landscape memory and landscape heritage. Furthermore, the proposed evaluation of such landscape elements can be applied to any landscape. The methodology also has many potential applications. For example, in landscape restoration – such as restoration of landscape elements like alleys, solitary trees, little water streams and ponds, etc. – the proposed procedure can identify relict landscape elements, which can be seen as a nuclei of further landscape restoration (similarly Gillarová et al., 2008).

The research has also proved that the Czech part of the Valticko case area is showing signs of large scale farming. Such large scale farming is seen as a threat to non-productive agricultural functions (Foley et al., 2005; Jackson et al., 2007). Therefore, if there was an effort to strengthen the non-productive agricultural functions in such a landscape, it would be necessary to understand the historical landscape pattern.

Our evaluation of stable landscape elements was inspired by (post)positivistic approaches. Nevertheless, it can be used in humanistic landscape studies and it can be a bridge between these two (sometimes antagonistic) approaches. Least but not last, we proved the essential need for a complex evaluation in land change studies, as some indices and results might indicate different landscapes to be similar (e.g. the share of stable plots vs. the share of stable plot boundaries). It is clear that land change research in the borderlands offers a wide range of topics to be further investigated. Furthermore, trans-boundary researches are broadening our understanding of (not only) landscape development in Czechia and in neighboring countries.